

Claims

What is claimed is:

1 Sub  
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5 B2 1. A method of controlling a contention state for a communication link between a  
6 base station controller and customer premises equipment in point-to-multipoint communication,  
7 comprising the step of:

8 controlling the contention state using a state machine, the state machine including  
9 a grant pending absent state in which the customer premises equipment is polled with a unicast  
10 request slot, wherein during the grant pending absent state, the customer premises equipment  
11 sends no upstream data to the base station controller but can use the unicast request slot to  
12 request a data slot for sending upstream data to the base station controller.

13  
14 2. A method as in claim 1, wherein the state machine further includes an idle state  
15 in which the customer premises equipment awaits arrival of data packets to send as upstream  
16 data to the base station controller.

17  
18 3. A method as in claim 2, wherein the state machine further includes a deferring  
19 state in which the customer premises equipment requests grant of a data slot for sending  
20 upstream traffic to the base station controller and if necessary defers contending for the data slot  
21 so as to avoid collisions with other customer premises equipment.

22  
23 4. A method as in claim 3, wherein the state machine further includes a grant  
24 pending state in which the customer premises equipment awaits and receives grant of the data  
25 slot for sending upstream data to the base station controller and sends upstream data to the base  
26 station controller after grant of the data slot.

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2 *Sub B2* 5. A method as in claim 4, wherein in the grant pending state, the customer  
3 premises equipment uses piggybacking to request grant of a next data slot while sending  
4 upstream data to the base station controller.

5  
6 6. A method as in claim 5, wherein the state machine enters the deferring state  
7 upon arrival of data packets to send as upstream data to the base station controller,  
8 wherein the state machine enters the grant pending state after the deferring state,  
9 returns to the deferring state if a collision occurs, and remains in the grant pending state when  
10 sending upstream data to the base station controller with piggybacking, and  
11 wherein the state machine enters the grant pending absent state after the customer  
12 premises equipment has sent upstream data to the base station controller in the grant pending  
13 state.  
14

15 7. A method as in claim 6, wherein the state machine further includes an  
16 unsolicited grant pending state in which the customer premises equipment receives grant of the  
17 data slot for sending upstream data to the base station controller and sends upstream data to the  
18 base station controller after grant of the data slot, without having requested the data slot.

19 8. A method as in claim 7, wherein the state machine further includes an  
20 unsolicited grant pending absent state in which the customer premises equipment is polled with  
21 the unicast request slot,

22 wherein during the unsolicited grant pending absent state, the customer premises  
23 equipment sends no upstream data to the base station controller but can use the unicast request  
24 slot to request the data slot for sending upstream data to the base station controller, and

1 wherein the state machine enters the unsolicited grant pending absent state after  
2 the customer premises equipment has sent upstream data to the base station controller in the  
3 unsolicited grant pending state.  
4

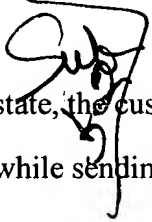
5 9. Customer premises equipment that communicates over a communication link  
6 with a base station controller in point-to-multipoint communication, comprising:  
7 a transceiver, and  
8 a controller that controls a contention state for communicating over the  
9 communication link via the transceiver, the controller using a state machine for controlling the  
10 contention state, the state machine including a grant pending absent state in which the customer  
11 premises equipment is polled with a unicast request slot, wherein during the grant pending absent  
12 state, the customer premises equipment sends no upstream data to the base station controller but  
13 can use the unicast request slot to request a data slot for sending upstream data to the base station  
14 controller.  
15

16 10. Customer premises equipment as in claim 9, wherein the state machine  
17 further includes an idle state in which the customer premises equipment awaits arrival of data  
18 packets to send as upstream data to the base station controller.  
19

20 11. Customer premises equipment as in claim 10, wherein the state machine  
21 further includes a deferring state in which the customer premises equipment requests grant of a  
22 data slot for sending upstream traffic to the base station controller and if necessary defers  
23 contending for the data slot so as to avoid collisions with other customer premises equipment.  
24

25 12. Customer premises equipment as in claim 11, wherein the state machine  
26 further includes a grant pending state in which the customer premises equipment awaits and

1 receives grant of the data slot for sending upstream data to the base station controller and sends  
2 upstream data to the base station controller after grant of the data slot.

3  
4  13. Customer premises equipment as in claim 12, wherein in the grant pending  
5 state, the customer premises equipment uses piggybacking to request grant of a next data slot  
6 while sending upstream data to the base station controller.

7  
8 14. Customer premises equipment as in claim 12, wherein the state machine  
9 enters the deferring state upon arrival of data packets to send as upstream data to the base station  
10 controller,

11 wherein the state machine enters the grant pending state after the deferring state,  
12 returns to the deferring state if a collision occurs, and remains in the grant pending state when  
13 sending upstream data to the base station controller with piggybacking, and

14 wherein the state machine enters the grant pending absent state after the customer  
15 premises equipment has sent upstream data to the base station controller in the grant pending  
16 state.

17  
18 15. Customer premises equipment as in claim 14, wherein the state machine  
19 further includes an unsolicited grant pending state in which the customer premises equipment  
20 receives grant of the data slot for sending upstream data to the base station controller and sends  
21 upstream data to the base station controller after grant of the data slot, without having requested  
22 the data slot.

23  
24 16. Customer premises equipment as in claim 15, wherein the state machine  
25 further includes an unsolicited grant pending absent state in which the customer premises  
26 equipment is polled with the unicast request slot,

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